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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,201	02/12/2002	Feng Yang	122-1.1	8601

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EXAMINER

PENDLETON, BRIAN T

ART UNIT	PAPER NUMBER
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2615

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/076,201	Applicant(s) YANG ET AL.	
	Examiner Brian T. Pendleton	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-32 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaka et al in view of Balan et al, US Patent Application Publication 2003/0233213 and further in view of Oh et al, US Patent 5,353,376. In figure 10, Isaka et al disclose a method and apparatus for processing speech comprising two input channels ch1, ch2 from signal detectors (inherently microphones), and a speech emphasis section (noise suppression unit) 100. The input channels are coupled to first beamformer 91 and second beamformer 92. Speech emphasis section 100 is shown in figure 13 which digitally processes the signals from the first and second beamformers. Isaka does not disclose that the speech processing apparatus is mounted on a mobile communication device, the signal detectors forming a small array. Balan et al suggest in paragraph 0003 that mobile communication devices can take advantage of using microphone arrays for the purpose of noise reduction and source separation. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the microphone array of Isaka et al in a mobile communication device, as taught by Balan et al. The combination of Isaka et al and Balan et al does not disclose a controller coupled to the first and second beamformers configured to enable the first beamformer to adapt during periods of speech

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activity and the second beamformer to adapt during periods of non-speech activity. Oh et al teach a system for improved speech acquisition comprising microphone array 10, blocking matrix 22, and adaptive filter 24. The blocking matrix and adaptive filter are used to isolate a noise source which is then subtracted from the output of summer 20 to produce an improved noise reduced signal 34. To avoid partial cancellation of the target signal (caused by signal leakage) by adaptive filter 24, the filter is configured to adapt only during periods of noise, as described in column 5 lines 12-17. Oh et al, therefore, advantageously teach a controller that is configured to adapt the noise beamformer during periods of non-speech activity. One of ordinary skill in the art would have realized without undue experimentation that the target signal beamformer should be adapted during periods of speech activity. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Isaka and Balan to incorporate a controller that controls the beamformers according to speech and non-speech activity, as suggested by Oh et al, for the purpose of eliminating signal leakage in the noise suppression unit. Claims 1, 2, 4, 5, 15, 16, 19, 20, and 23-27 are met. As to claim 3, the beamformers 91, 92 (shown in figure 2) have an adaptive filter 2 therefore they and speech emphasis section 100 are implemented within a digital signal processor. Per claims 6, 7, 8, 21, and 28, the speech emphasis section has FFT units 101, 104 to process the first and second signals from the beamformers in the frequency domain using spectral subtraction. Per claim 9, there is disclosed weighting section 108. Step S309 discloses that weighting involves multiplication of the signals from the speech signal transformation (paragraph 121) with weights, therefore inherently there is a multiplier configured to receive and scale the first transformed signal (speech) with a set of coefficients. As to claims 10, 11 and 29, the weights (coefficients)

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are derived in band weight computation section 107 (step S308) which is based on noise power and speech power computations (units 103, 106). The band weight computation section 107 is the gain calculation unit. The weighting section 108 scales the speech signal based on the weights. Per claims 12 and 30, the circuitry of Isaka provides a time varying noise spectrum estimate. As to claims 13 and 14, Oh et al teach an activity detector in column 5 lines 35-43 in the form of a push to talk button for the user. Regarding claim 17, beamformers 91, 92 in figure 2 have an adaptive filter 24 which, as modified by Oh et al, would receive a signal from a speech activity detector to provide a corresponding filtered signal. As to claim 18, paragraph 65 of Isaka discloses the filter 24 uses a LMS algorithm. As to claim 22, it was obvious to process signals in either the time or frequency domain.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bartlett et al, US Patent 5,473,684.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (571) 272-7527. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

btp


BRIAN TYRONE PENDLETON
PRIMARY EXAMINER